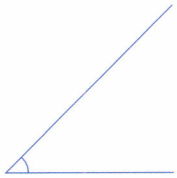
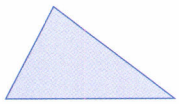
Glossary

A

acute angle An angle whose measure is less than 90°.



acute triangle A triangle in which each of the three interior angles measures less than 90°.



algebra tiles A collection of squares and rectangles, with different-coloured sides, that are used to represent units and variables.

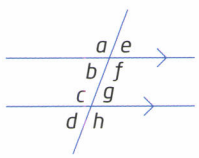
algebraic expression A mathematical phrase made up of numbers and variables, connected by addition and/or subtraction operators.

$x - 3$, $5y$, and $6 + 2k$ are algebraic expressions.

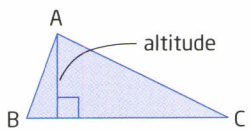
algebraic modelling The process of representing a relationship by an equation or a formula, or representing a pattern of numbers by an algebraic expression.

alternate angles Pairs of equal angles formed on either side of a transversal crossing a pair of parallel lines.

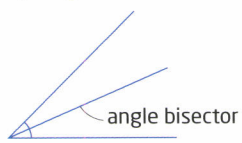
$b = g$
$c = f$



altitude The height of a geometric shape.

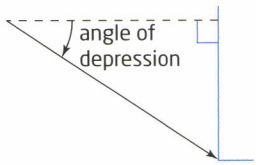


angle bisector A line that divides an angle into two equal parts.

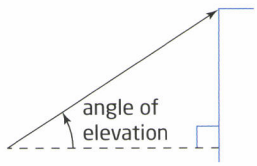


angle of declination Another name for angle of depression.

angle of depression An angle measured below the horizontal.



angle of elevation An angle measure above the horizontal.



angle of inclination Another name for angle of elevation.

area The number of square units contained in a two-dimensional region.

average Another name for mean. The sum of a set of values divided by the number of values in the set.

The mean of 1, 5, and 6 is $\frac{1 + 5 + 6}{3}$, or 4.

axis of symmetry A line that divides a figure into two congruent parts.

B

base (of a power) The number used as a factor for repeated multiplication.

In 6^3, the base is 6.

BEDMAS A way of remembering the order of operations. BEDMAS stands for **B**rackets, **E**xponents, **D**ivision, **M**ultiplication, **A**ddition, **S**ubtraction.

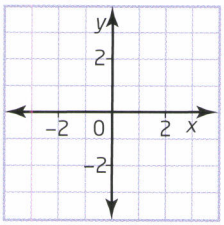
binomial A polynomial that has two terms.

$3x + 4$ is a binomial.

bisect Divide into two equal parts.

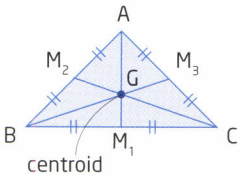
C

Cartesian coordinate system The system developed by René Descartes for graphing points as ordered pairs on a grid, using two perpendicular number lines. Also referred to as the Cartesian plane, the coordinate grid, or the *xy*-plane.



Cartesian grid A grid with perpendicular axes. See Cartesian coordinate system.

centroid The point where the three medians of a triangle intersect.

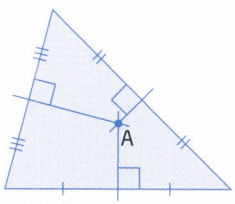


cevian A line segment that joins a vertex of a triangle to any point on the opposite side.

chord A line segment joining two points on a curve.

circle The set of all points in the plane that are equidistant from a fixed point called the centre.

circumcentre The point of intersection of the three right bisectors of the sides of a triangle.



A is the circumcentre.

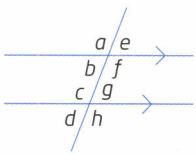
circumference The perimeter of a circle.

coefficient The number by which a variable is multiplied.

In the term $8y$, the coefficient is 8.

co-interior angles Pairs of supplementary angles formed between a pair of parallel lines crossed by a transversal.

$b + c = 180°$ $f + g = 180°$



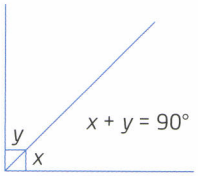
collecting like terms Simplifying an expression containing like terms by adding their coefficients.

collinear Lying on the same line.

common factor A number that is a factor of (divides evenly into) all the numbers in a set.

3 is a common factor of 6, 12, and 15.

complementary angles Angles whose sum is 90°.



completing the square A process for expressing $y = ax^2 + bx + c$ in the form $y = a(x - h)^2 + k$.

concurrent Meeting at a single point.

congruent figures Figures that are identical in size and shape.

conjecture A general conclusion drawn from a number of individual facts. It may or may not be true.

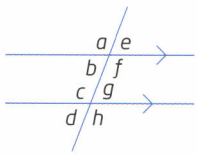
constant term A term that contains no variables. Its value does not change.

In $2x + 5$, the constant term is 5.

contained angle The interior angle formed at a vertex between two adjacent sides of a polygon.

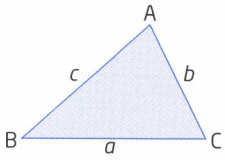
corresponding angles Pairs of equal angles, in corresponding positions, formed by a transversal crossing a pair of parallel lines.

$a = c$ $b = d$ $e = g$ $f = h$



cosine law The relationship between the cosine of an angle and the lengths of the three sides in any acute triangle.

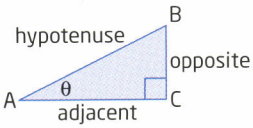
$a^2 = b^2 + c^2 - 2bc(\cos A)$
$b^2 = a^2 + c^2 - 2ac(\cos B)$
$c^2 = a^2 + b^2 - 2ab(\cos C)$



cosine ratio For an acute angle in a right triangle, the ratio of the length of the adjacent side to the length of the hypotenuse.

$$\text{cosine} = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\cos\theta = \frac{AC}{AB}$$



counterexample An example that proves that a hypothesis or conjecture is false.

cube A prism with six congruent square faces.

curve of best fit A smooth curve drawn to approximate the general path or trend in a scatter plot.

cylinder A three-dimensional object with two parallel circular bases.

D

degree (of a polynomial) The degree of the greatest-degree term.

$5x^3 + 2x^2 - x + 1$ has degree 3.

degree (of a term) The sum of the exponents on the variables in a term.

The degree of $5x^2y$ is 3.

denominator The number of equal parts in the whole or the group.

$\frac{3}{4}$ has denominator 4.

dependent variable In a relation, the variable whose value depends on the value of the other variable (the independent variable). On a coordinate grid, the values of the dependent variable are on the vertical axis.

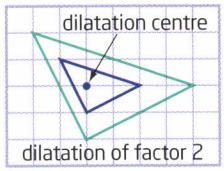
In $d = 85t$, d is the dependent variable.

diagonal A line segment joining two non-adjacent vertices of a polygon.

diameter A line segment joining two points on the circumference that passes through the centre of a circle.

difference of squares An expression of the form $a^2 - b^2$ that involves the subtraction of two squares.

dilatation A transformation of a geometric shape that is an enlargement or reduction by a fixed factor.



distributive property $a(x + y) = ax + ay$.

dynamic geometry software Computer software that allows the user to construct two-dimensional shapes, measure them, and transform them by moving their parts.

E

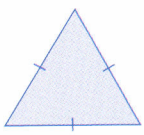
equation A mathematical statement that says two expressions are equal.

$5k - 2 = 3k + 4$ is an equation.

equiangular Having all angles equal.

equidistant The same distance away from a given line or point.

equilateral triangle A triangle with all three sides equal.



equivalent expressions Algebraic expressions that are equal for all values of the variable.

$7a - 3a$ and $4a$ are equivalent expressions.

equivalent fractions Fractions, such as $\frac{1}{3}$, $\frac{2}{6}$, and $\frac{3}{9}$, that represent the same part of a whole or group.

equivalent linear equations Equations that have the same graph.

equivalent linear systems Two or more linear systems that have the same solution.

equivalent rational numbers Numbers, such as $-1\frac{1}{2}$ and -1.5, that represent the same rational number.

equivalent ratios Ratios, such as 1:3, 2:6, and 3:9, that represent the same division of the whole.

estimate A guess at a measurement based on known comparisons, or a rough calculation using approximate numbers.

evaluate To determine a value for an expression or formula.

expand Multiply, often using the distributive property.

expanded form (of a power) The product of like factors that is equivalent to a power.

$2 \times 2 \times 2 \times 2 \times 2$ is the expanded form of 2^5.

exponent A raised number to denote repeated multiplication of a base.

In 3^4, the exponent is 4.

exponent laws A set of rules that can be used to simplify powers. See product rule, quotient rule, and power of a power rule.

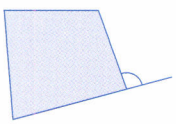
exponential form A shorthand method for writing numbers expressed as repeated multiplications.

3^4 is the exponential form for $3 \times 3 \times 3 \times 3$ or 81.

expression A mathematical phrase made up of numbers and variables, connected by operators.

$3x + 2$ is an expression.

exterior angle An angle contained between one side of a polygon and the extension of an adjacent side.



extrapolate Estimate values lying outside the given range of data. To extrapolate from a graph means to estimate coordinates of points beyond those that are plotted.

F

face A plane surface of a polyhedron.

factor A number and/or variable that divides evenly into a specified product.

For example, $2x$ and $2y$ are factors of $4xy$.

finite differences Differences found from the y-values in a table of values with evenly spaced x-values. See first differences and second differences.

first differences Differences between consecutive y-values in a table of values with evenly spaced x-values.

x	y	First Differences
1	3	
2	5	5 – 3 = 2
3	7	7 – 5 = 2
4	9	9 – 7 = 2
5	11	11 – 9 = 2

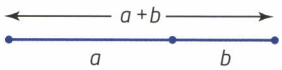
formula An algebraic relationship between two or more variables.

fractal A geometric pattern that repeats infinitely with a smaller scale for each repetition.

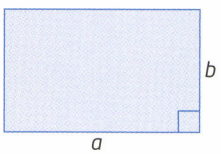
G

GCF See greatest common factor.

golden ratio The ratio of two quantities or lengths, a and b, related by the equation $\frac{a}{b} = \frac{a+b}{a}$.



golden rectangle A rectangle whose length, a, and width, b, are in the golden ratio.



graphing calculator A hand-held device capable of a wide range of mathematical operations, including graphing from an equation and constructing a scatter plot and a line or curve of best fit.

graphing software Computer software that provides features similar to those of a graphing calculator.

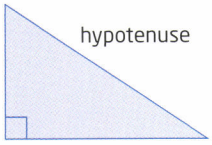
greatest common factor (GCF) The greatest number and/or variable that is a factor of two or more numbers or terms.

The GCF of 12 and 8 is 4.
The GCF of $12x^2y$ and $6xy^2$ is $6xy$.

H

hexagon A polygon with six sides.

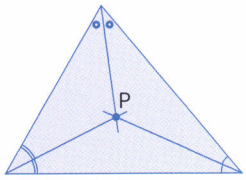
hypotenuse The longest side of a right triangle.



I

improper fraction A fraction in which the numerator is greater than the denominator, such as $\frac{8}{5}$.

incentre The point at which the three angle bisectors of a triangle meet.



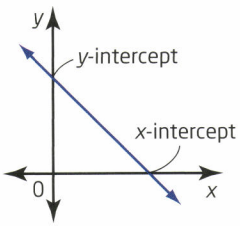
P is the incentre.

independent variable In a relation, the variable that you need to know first. Its value determines the value of the dependent variable. On a coordinate grid, the values of the independent variable are on the horizontal axis.

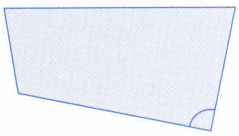
In $d = 85t$, t is the independent variable.

integer A number in the sequence ..., −3, −2, −1, 0, 1, 2, 3, ...

intercept The distance from the origin of the xy-plane to the point at which a line or curve crosses a given axis.

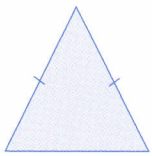


interior angle An angle that is formed inside a polygon by two sides meeting at a vertex.



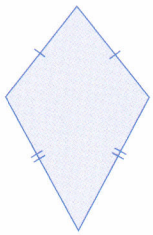
isometry A transformation that preserves size and shape.

isosceles triangle A triangle with exactly two equal sides.



K

kite A quadrilateral with two pairs of adjacent sides equal.



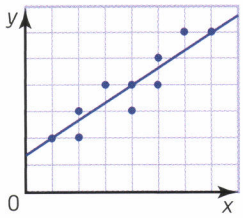
L

leg (of a right triangle) In a right triangle, either of the sides containing the right angle.

like terms Terms that have the same variable(s) raised to the same exponent(s).

$3xy$, $-xy$, and $2.5xy$ are like terms.

line of best fit The straight line that passes through or as near as possible to the points on a scatter plot.



line of symmetry A line that divides a shape into two congruent shapes that are reflections of each other in the line.

line segment The part of a line that joins two points.

linear equation An equation that relates two variables so that ordered pairs satisfying the equation form a straight-line pattern on a graph.

linear regression A mathematical process used by graphing calculators and graphing software to find the line of best fit.

linear relation A relation between two variables that appears as a straight line when graphed on the coordinate plane.

linear system A set of two or more linear equations that are considered at the same time.

literal coefficient The variable part of a term.

In $5xy$, the literal coefficient is xy.

lowest terms The form in which the numerator and the denominator of a fraction have no common factors other than 1.

$\frac{3}{5}$ is in lowest terms.

M

mathematical model A mathematical description of a real situation. The description may be a diagram, a graph, a table of values, an equation, a formula, a physical model, or a computer model.

maximum The greatest value in a set of data.

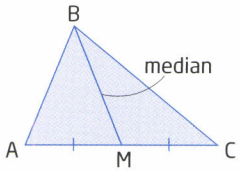
maximum point The point on the graph of a non-linear relation, such as a parabola, at which the curve changes from increasing to decreasing.

mean The sum of a set of values divided by the number of values in the set.

The mean of 2, 8, 4, 6, and 10 is $\frac{2 + 8 + 4 + 6 + 10}{5}$, or 6.

median (geometry) A line segment that joins a vertex of a triangle to the midpoint of the opposite side.

BM is a median of $\triangle ABC$.



method of elimination A method for solving a linear system by matching the coefficients of one variable and then adding or subtracting the equations to eliminate that variable.

method of substitution A method for solving a linear system by substituting for one variable from one equation into the other equation.

midpoint The point that divides a line segment into two equal segments.

minimum The least value in a set of data.

mimimum point The point on the graph of a non-linear relation, such as a parabola, at which the curve changes from decreasing to increasing.

mixed number A number that is part integer and part fraction, such as $3\frac{1}{2}$.

monomial A polynomial with one term, such as $7x$.

N

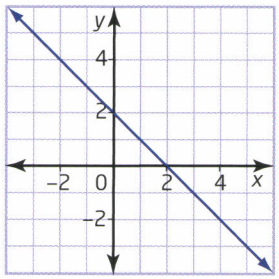
natural number A number in the sequence 1, 2, 3, 4, ...

negative reciprocals Two numbers whose product is -1.

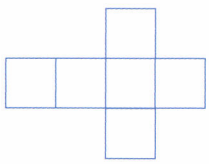
$\frac{3}{4}$ and $-\frac{4}{3}$ are negative reciprocals.

negative slope The ratio of rise to run of a line that rises to the left.

The line shown has slope -1.



net A two-dimensional (flat) pattern that can be cut out, folded, and taped to form a three-dimensional shape. A net for a cube is shown.



non-linear relation A relationship between two variables that does not follow a straight line when graphed.

numerator The number of equal parts being considered in the whole or the group.

$\frac{3}{4}$ has numerator 3.

numerical coefficient The number factor in a term.

In $7x^2$, the numerical coefficient is 7.

O

obtuse angle An angle that measures more than 90° but less than 180°.

obtuse triangle A triangle containing one obtuse angle.

octagon A polygon with eight sides.

opposite angles When two lines cross, the pairs of angles formed on either side.

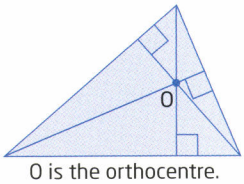
opposite integers Two integers, such as 5 and -5, that are an equal distance either side of 0. Their sum is 0.

order of operations The convention for evaluating expressions containing several operations: Brackets, Exponents, Division, Multiplication, Addition, Subtraction (see BEDMAS).

ordered pair A pair of numbers, such as (2, 5), used to locate a point on the coordinate plane.

origin The point of intersection of the x-axis and the y-axis on a coordinate grid. The point (0, 0).

orthocentre The point at which the three altitudes of a triangle meet.



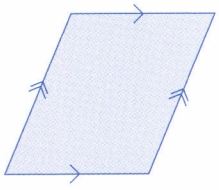
O is the orthocentre.

P

parabola The graph of a quadratic relation, which is U-shaped and symmetrical.

parallel lines Lines in the same plane that never meet. On a graph, parallel lines have the same slope.

parallelogram A quadrilateral with two pairs of opposite sides that are parallel.



pentagon A five-sided polygon.

percent A fraction whose denominator is 100.

72% means $\frac{72}{100}$.

perfect square A number that can be expressed as the product of two identical factors.

36 is a perfect square, because $36 = 6 \times 6$.

perfect square trinomial A trinomial of the form $a^2 + 2ab + b^2$ or $a^2 - 2ab + b^2$ that is the result of squaring a binomial.

perimeter The distance around the outside of a shape.

perpendicular bisector See right bisector.

perpendicular lines Two lines that cross at 90°. On a graph, perpendicular lines have slopes that are negative reciprocals (their product is -1).

point of intersection The point where two or more lines cross.

polygon A two-dimensional closed figure whose sides are line segments.

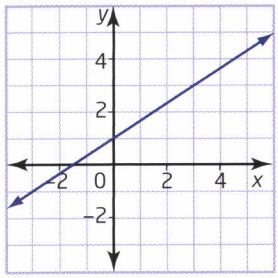
polyhedron A three-dimensional object with faces that are polygons.

polynomial An algebraic expression formed by adding or subtracting terms.

polynomial expression An algebraic expression made up of one or more terms separated by addition or subtraction.

positive slope The ratio of the rise to the run of a line that rises to the right.

The line shown has slope $\frac{2}{3}$.



power A short form of writing repeated multiplication of the same number by itself.

5^3, x^2, and 10^7 are powers.

power of a power rule A power of a power can be written as a single power by multiplying the exponents.

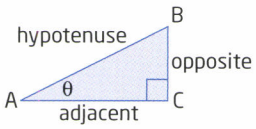
$(x^a)^b = x^{ab}$

primary trigonometric ratios The three ratios, sine, cosine, and tangent, defined in a right triangle.

$$\text{sine } \theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\text{cosine } \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\text{tangent } \theta = \frac{\text{opposite}}{\text{adjacent}}$$



prime number A number with exactly two factors—itself and 1.

2, 5, and 13 are prime numbers.

product The result of multiplication.

product rule To multiply powers with the same base, add the exponents.

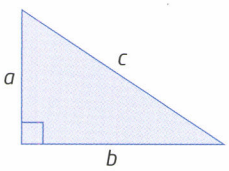
$x^a \times x^b = x^{a+b}$

proportion A statement that two ratios are equal. Can be written in fraction form or in ratio form.

$\frac{2}{5} = \frac{4}{10}$ or 2:5 = 4:10.

Pythagorean theorem In a right triangle, the square of the length of the hypotenuse is equal to the sum of the squares of the two shorter side lengths.

$c^2 = a^2 + b^2$



Q

quadratic equation An equation in the form $ax^2 + bx + c = 0$, where a, b, and c are real numbers and $a \neq 0$.

quadratic expression A second-degree polynomial.

$3x^2 + 5x - 1$ is a quadratic expression.

quadratic formula A formula for determining the roots of a quadratic equation of the form $ax^2 + bx + c = 0$.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

quadratic regression A mathematical process used by graphing calculators and graphing software to find the quadratic curve of best fit.

quadratic relation A relation whose equation is in the form $y = ax^2 + bx + c$, where a, b, and c are real numbers and $a \neq 0$.

quadrilateral A polygon that has four sides.

quotient The result of division.

quotient rule To divide powers with the same base, subtract the exponents.

$x^a \div x^b = x^{a-b}$

R

radius A line segment joining the centre of a circle to a point on the circumference, or the length of this line segment.

rate A comparison of two quantities expressed in different units.

60 km/h and \$12.95/kg are rates.

ratio A comparison of two quantities with the same units.

rational number A number that can be expressed as the quotient of two integers, where the divisor is not zero.

0.75, $\frac{3}{4}$, and -2 are rational numbers.

ray A part of a line, with one endpoint.

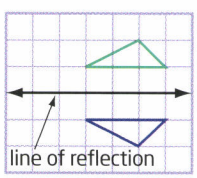
reciprocals Two numbers that have a product of 1.

3 and $\frac{1}{3}$ are reciprocals.

rectangle A quadrilateral with two pairs of equal opposite sides and four right angles.

rectangular prism The mathematical name for a box with six rectangular faces with right angles at every corner.

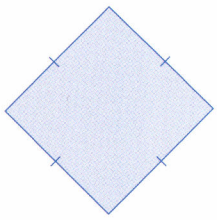
reflection A transformation in which a point and its image are equidistant from the line of reflection.



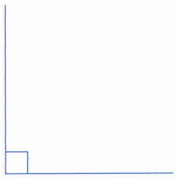
regular polygon A polygon with all sides equal and all interior angles equal.

relation An identified pattern, or relationship, between two variables. It may be expressed as ordered pairs, a table of values, a graph, or an equation.

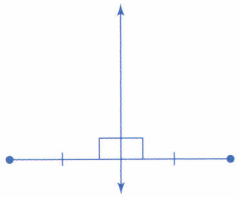
rhombus A quadrilateral in which the lengths of all four sides are equal.



right angle An angle that measures 90°.

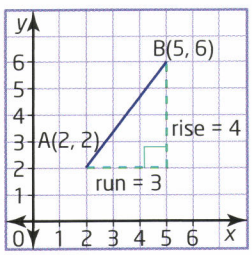


right bisector A line that is perpendicular to a line segment and divides the line segment into two equal parts. Also called a perpendicular bisector.



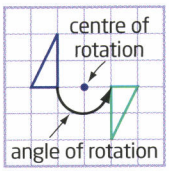
right triangle A triangle containing a 90° angle.

rise The vertical distance between two points.



root The value of the variable that makes an equation true. The same as the solution of an equation.

rotation A transformation of a geometric shape in which each point is turned about a centre point, the centre of rotation.



run The horizontal distance between two points. See the diagram for rise.

S

scale factor The factor, often denoted by k, that relates corresponding side lengths of two similar figures.

scalene triangle A triangle with no sides equal.

scatter plot A graph showing two-variable data as points plotted on a coordinate grid. See line of best fit and curve of best fit.

scientific notation A method of writing large or small numbers that contain many zeros. The decimal is placed to the right of the first non-zero digit and the exponent on the base 10 tells how the decimal point is moved.

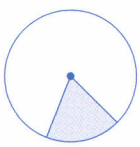
$123\ 000 = 1.23 \times 10^5$
$0.000\ 000\ 085 = 8.5 \times 10^{-8}$

second-degree polynomial A polynomial of the form $ax^2 + bx + c$, where $a \neq 0$.

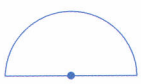
second differences The differences between consecutive first differences in a table of values with evenly spaced x-values.

x	y	First Differences	Second Differences
1	2		
2	5	5 – 2 = 3	
3	10	10 – 5 = 5	5 – 3 = 2
4	17	17 – 10 = 7	7 – 5 = 2
5	26	26 – 17 = 9	9 – 7 = 2

sector A part of a circle bounded by two radii and an arc of the circumference.



semicircle Half of a circle.



sequence An ordered list of numbers.

similar figures Figures in which corresponding sides are in proportion and corresponding angles are equal.

simplest form (of a ratio) When the terms of the ratio are whole numbers having no common factors other than 1.

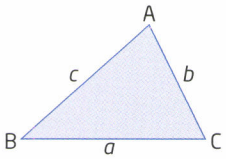
simplest form (of an algebraic expression) An expression with no like terms. For example,

$2x + 7$ is in simplest form; $5x + 1 + 6 - 3x$ is not.

simplify Find a simpler and shorter equivalent expression.

sine law The relationship between the sides and their opposite angles in any acute triangle.

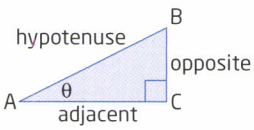
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$



sine ratio For an acute angle in a right triangle, the ratio of the length of the opposite side to the length of the hypotenuse.

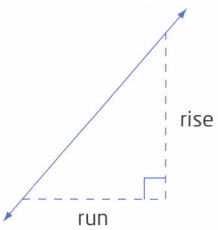
$$\text{sine} = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\sin \theta = \frac{BC}{AB}$$

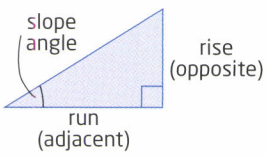


slope A measure of the steepness of a line.

$$\text{slope} = \frac{\text{rise}}{\text{run}}$$



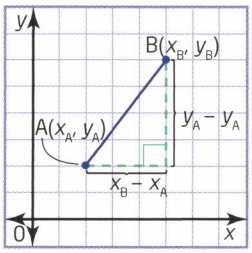
slope angle The angle in a right triangle opposite to the rise and adjacent to the run.



slope formula The slope, m, of a line containing the points $A(x_A, y_A)$ and $B(x_B, y_B)$ is

$$m_{AB} = \frac{\text{vertical change}}{\text{horizontal change}} \text{ or } \frac{\text{rise}}{\text{run}}$$

$$= \frac{y_B - y_A}{x_B - x_A}, \; x_B \neq x_A$$



slope *y*-intercept form of a linear equation The equation of a line in the form $y = mx + b$, where m is the slope and b is the y-intercept.

solution The value of the variable that makes an equation true. The same as the root of an equation.

square A rectangle in which the lengths of all four sides are equal.

square-based prism A prism with two square faces as bases and four rectangular side faces.

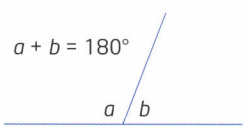
square root A number that is multiplied by itself to give another number. The square root of 36 is 6 or -6. The radical sign means the positive square root. For example, $\sqrt{36} = 6$.

standard form of the equation of a line The equation of a line in the form $Ax + By + C = 0$, where A, B, and C are whole numbers, and A and B are not both equal to zero.

straight angle An angle that measures 180°.

substitution Replacing a variable by a value.

supplementary angles Angles whose sum is 180°.



surface area The number of square units needed to cover the surface of a three-dimensional object.

survey A question or questions asked of a sample of a population.

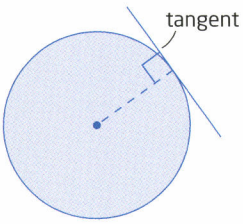
T

table of values A table used to record the coordinates of points in a relation. For example:

$y = x + 3$

x	y
0	3
1	4
2	5

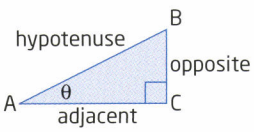
tangent of a circle A line that touches a circle at only one point. It is perpendicular to the radius at that point.



tangent ratio For an acute angle in a right triangle, the ratio of the length of the opposite side to the length of the adjacent side.

$$\text{tangent} = \frac{\text{opposite}}{\text{adjacent}}$$

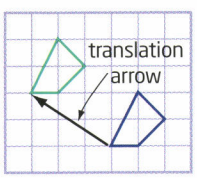
$$\tan \theta = \frac{BC}{AC}$$



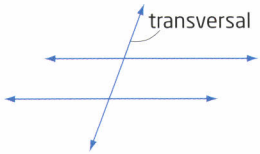
term A number or a variable, or the product of numbers and variables.

The expression $5x + 3$ has two terms: $5x$ and 3.

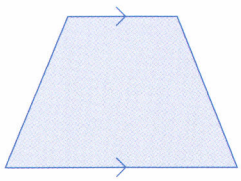
translation A transformation of a geometric shape in which each point is moved the same distance in the same direction.



transversal A line that crosses or intersects two or more lines.

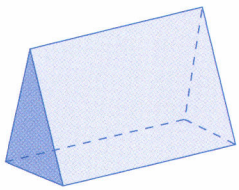


trapezoid A quadrilateral with one pair of parallel sides.



triangle A three-sided polygon.

triangular prism A prism with triangular bases.



trinomial A polynomial with three terms.

$x^2 + 3x - 1$ is a trinomial.

two-variable data A set of data with two lists of data. Each entry in one list is related in some way to an entry in the other list.

U

unlike terms Terms that have different variables, or the same variable but different exponents.

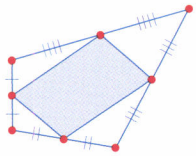
$2x$, $5y$, and x^2 are unlike terms.

V

variable A letter used to represent a value that can change or vary. For example, t is the variable in the expression $2t + 3$.

variable term A term that contains a variable. Its value changes when the value of the variable changes.

Varignon parallelogram The parallelogram formed by joining the midpoints of adjacent sides of a quadrilateral.



vertex (of a parabola) The point on a parabola where the curve changes direction. It is a maximum point if the parabola opens downward and a minimum point if the parabola opens upward.

vertex (of a polygon) A point at which two sides of a polygon meet.

volume The amount of space that an object occupies, measured in cubic units.

W

whole number A number in the sequence 0, 1, 2, 3, 4, 5, ...

X

***x*-axis** The horizontal number line in the Cartesian coordinate system.

***x*-coordinate** The first number in the ordered pair describing a point in the Cartesian coordinate system.

The point P(2, 5) has *x*-coordinate 2.

***x*-intercept** The *x*-coordinate of the point where a line or curve crosses the *x*-axis. At this point, $y = 0$.

***xy*-plane** A coordinate system based on the intersection of two perpendicular lines called axes. The horizontal axis is the *x*-axis, and the vertical axis is the *y*-axis. The point of intersection of the axes is called the origin. Also referred to as the Cartesian coordinate system, the Cartesian plane, or the coordinate grid.

Y

***y*-axis** The vertical number line in the Cartesian coordinate system.

***y*-coordinate** The second number in the ordered pair describing a point in the Cartesian coordinate system.

The point Q(−3, 4) has *y*-coordinate 4.

***y*-intercept** The *y*-coordinate of the point where a line or curve crosses the *y*-axis. At this point, $x = 0$.

Z

zero A value for *x*, or the independent variable, for which the dependent variable has value 0. It corresponds to the *x*-intercept of the graph of the relation.

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